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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/621,589	07/17/2003	Jong-Kwon Kim	5000-1-329	2611

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EXAMINER	
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ART UNIT	PAPER NUMBER
2613	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/621,589	KIM ET AL.	
	Examiner	Art Unit	
	Thi Q. Le	2613	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *11/27/2006*.

2a)☒ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-14* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *7,8 and 12-14* is/are allowed.

6)☐ Claim(s) *1,3-6 and 9-11* is/are rejected.

7)☐ Claim(s) *2* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *17 July 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Priority

1. Acknowledgment is made of applicant's claim for foreign priority under 35 U.S.C. 119(a)-(d).

Information Disclosure Statement

2. The information disclosure statement (IDS) filed on 7/14/2005 was considered by the examiner.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

5. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any

evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

6. **Claims 1, 3, 5 and 9-11** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Hidenori et al. (Japanese Publication JP11087815)** in view of **Shimomura et al. (US PGPub 2003/0048507)**.

Consider **claim 1**, Hidenori et al. clearly show and disclose; an optical source generator for wavelength-division-multiplexing optical communication systems, comprising: a pumping-light generation section (read as, excitation light source, 14) configured to generate and output pumping lights (Drawing 1; paragraph 0024); a wavelength-division multiplexer/demultiplexer (read as, Mul/Demul, 12) being provided with one multiplexing port and a plurality of demultiplexing ports being configured to wavelength-division-multiplex and to output optical signals inputted into the multiplexing port, and being configured to wavelength-division-demultiplex and to output optical signals inputted into the demultiplexing ports (Drawing 1; paragraph 0026); a plurality of wavelength-dependent reflectors (read as, reflective components, 18-1 – 18-n), each being connected to one of the respective demultiplexing ports of the wavelength-division multiplexer/demultiplexer and each being configured to reflect only optical signals that have a particular wavelength that corresponds to one of the respective said demultiplexing ports (Drawing 1; paragraph 0029); and each amplifier being configured to generate spontaneously emitted lights in response to pumping lights generated from the pumping-light generation section (paragraph 0028; drawing 1).

Hidenori et al. fail to disclose, an optical path converter being configured to output the pumping lights generated and received from the pumping-light generation section to the

multiplexing port of the wavelength-division multiplexer/demultiplexer by converting a path of the pumping lights and being configured to output optical signals outputted from the multiplexing port of the wavelength-division multiplexer/demultiplexer through converted paths for the optical signals; a plurality of optical fiber amplifiers, each having two sides: one side of which being connected to one of the associated wavelength-dependent reflectors; and a plurality of wavelength-independent reflectors, each being connected to the other side of one of the respective optical fiber amplifiers.

It would have been obvious for a person of ordinary skill in the art at the time of the invention to understand that the function of amplifier 10 and reflective component 16 are amplifying optical signal and reflecting incident light in all wavelengths. It would have been a matter of design choice to place the combination of reflective component 16 and amplifier 10 before or after the Mul/Demul 12 and before the reflective component 18-1 – 18-n (looking from left to right); since placing the combination of amplifier 10 and reflective component 16 before or after the Mul/Demul 12 and before the reflective component 18-1 – 18-n, would provide an equivalent functionality and purpose of the invention as disclosed by Hidenori et al. Also, by placing the combination of reflective component 16 and amplifier 10 after the Mul/Demul 12 (i.e. for each output branch of the Mul/Demul 12 the combination of reflective component 16 and amplifier 10 is placed before the reflective component 18-1 – 18-n), the operations of the apparatus disclosed by Hidenori et al. would perform faster, because reflected signal no longer need to be combine and separated for each pass through of the amplifier.

Further, in related art, Shimomura et al. disclose, an optical path converter configured to output the pumping lights generated and received from the pumping-light generation section to

the multiplexing port of the wavelength-division multiplexer/demultiplexer by converting a path of the pumping lights and to output optical signals outputted from the multiplexing port of the wavelength-division multiplexer/demultiplexer through converted paths for the optical signals (read as, the optical circulator 60 receive input from optical fiber 110, and directs it to optical fiber 120; which is connected to optical demultiplexer/multiplexer 410; figure 15) (paragraph 0326); and a plurality of optical fiber amplifiers, each having two sides: one side of which being connected to one of the associated wavelength-dependent reflectors (read as, optical amplifier 41 is connected wavelength band selective optical reflecting mirrors 25-28; figure 15, paragraph 0327).

It would have been obvious for a person of ordinary skill in the art at the time of the invention to incorporate the teachings of Shimomura et al. with Hidenori et al. Because adding an optical circulator allow the optical source generator to output two types of optical signals, one that have only one wavelength in the optical signal, and another that have a plurality of wavelengths in the optical signal. Thus, expanding the flexibility and functionality of an optical source generator.

Consider **claim 3, and as applied to claim 1 above**, Hidenori et al. as modified by Shimomura et al. further disclose; wherein the wavelength-dependent reflectors comprise fiber-Bragg (read as, optical fiber grating) gratings which are each connected respectively to the demultiplexing ports of the wavelength-division multiplexer/demultiplexer (Hidenori et al.; Drawings 1 and 2; paragraph 0048).

Consider **claim 9, and as applied to claim 1 above**, Hidenori et al. as modified by Shimomura et al. further disclose; wherein the optical source generator is configured to output

light bidirectionally (read as, the combination of optical circulator as disclosed by Shimomura et al. and the multi-wavelength light source disclosed by Hidenori et al. would have provided an optical light source generator that is can output light bidirectionally; Hidenori, drawing 1; Shimomura, figure 15).

Consider **claim 10, and as applied to claim 1 above**, Hidenori et al. as modified by Shimomura et al. further disclose; wherein each of the wavelength-dependent reflectors is configured to transmit a portion of the optical signals incident upon its surface (read as, the reflectance of reflector element 18-1 – 18-n is less than 100%; which means part of incident light is transmitted while part is reflected; Hidenori, drawing 1 paragraph 0031).

Consider **claim 11, and as applied to claim 1 above**, Hidenori et al. as modified by Shimomura et al. further disclose; wherein each of the wavelength-independent reflectors is configured to transmit a portion of the optical signals incident upon its surface (read as, the reflectance of reflector element 16 is less than 100%; which means part of incident light is transmitted while part is reflected; Hidenori, drawing 1 paragraph 0028).

Consider **claim 5, and as applied to claim 1 above**; Hidenori et al. as modified by Shimomura et al., further disclose; wherein the optical path converter includes an optical circulator (read as, optical circulator, 60; figure 15) comprising: a first port (read as, port connected to fiber 110; figure 15) configured to input pumping lights generated from the pumping-light generation section; a second port (read as, port connected to fiber 120; figure 15) connected to the multiplexing port of the wavelength-division multiplexer/demultiplexer; and, a third port (read as, port connected to fiber 121; figure 15) configured to output the wavelength-division-multiplexed optical signals (Shimomura et al.; Figure 18; paragraph 0326).

7. **Claim 4** is rejected under 35 U.S.C. 103(a) as being unpatentable over **Hidenori et al. (Japanese Publication JP11087815)** in view of **Shimomura et al. (US PGPub 2003/0048507)** and further in view of **Zhang et al. (US PGPub 2003/0179998)**.

Consider **claim 4, as applied to claim 1 above**, Hidenori et al. as modified by Shimomura et al. disclose the invention as described above; except for, wherein the wavelength-dependent reflectors comprise thin film-filter reflectors which are each connected respectively to the demultiplexing ports of the wavelength-division multiplexer/demultiplexer and have respective thin film filters.

In related art, Zhang et al. disclosed in today's all-optical dense wavelength division multiplexing networks, three prevailing types of wavelengths selecting technology are use: 1) Thin Film Filter (TFF) (read as, thin film-filter reflector), (2) Arrayed Waveguide (AWG), and (3) Fiber Bragg Grating (FBG). Currently, TFF technology is the predominant choice when the spacing requirements of the wavelength selective device are greater than 100 GHz. The advantages of TFF-based devices are that they are relatively insensitive to temperature, have minimal cross talk, and provide good isolation between different wavelengths (paragraph 0003).

It would have be obvious to a person of ordinary skill in the art at the time of the invention to incorporate the teachings of Zhang et al. with Hidenori et al. as modified by Kyong et al. and further as modified by Inada et al. Because the advantages of TFF-based devices are that they are relatively insensitive to temperature, have minimal cross talk, and provide good isolation between different wavelengths.

8. **Claim 6** is rejected under 35 U.S.C. 103(a) as being unpatentable over **Hidenori et al. (Japanese Publication JP11087815)** in view of **Kyong et al. (Japanese Publication**

JP08162697) and further in view of **Inada et al. (US Patent # 6,920,261)** and further in view of **Tomaru et al. (US PGPub 2003/0210730)**.

Consider **claim 6, and as applied to claim 1 above**, Hidenori et al. as modified by Shimomura et al. disclose the invention as described above; except for, the optical source generator further comprising a plurality of modulators configured to use wavelength-division-multiplexed lights passing through the wavelength-independent reflectors as individual optical sources.

In related art, Tomaru et al. disclosed an optical transmitter; wherein a multi-wavelength solid-state laser output the laser signal. The laser signal is separated into individual wavelengths; the separated wavelengths are feed into individual modulators. Wherein, the wavelengths are modulated with a data signal before transmission (Figure 13; paragraph 0043).

It would have be obvious to a person of ordinary skill in the art at the time of the invention to incorporate the teachings of Tomaru et al with Hidenori et al. as modified by Kyong et al. and further as modified by Inada et al. Since data to be transmitted using WDM need to be first modulated only a wavelength. After producing a multiple separated wavelengths, then there must be a modulator so that data can be modulated into each wavelength for transmission over the WDM optical network.

Allowable Subject Matter

9. Claims 7-8, 12-14 are allowed.

10. The following is an examiner's statement of reasons for allowance:

Considering **claim 7**, prior arts fail to disclose, an optical band pass filter: having two sides: one side being connected to the third port of the optical path converter, the optical band

pass filter being configured to pass only the optical source bands; and wherein the optical band pass filter is interposed between tile first plurality of wavelength-independent reflectors and the wavelength-independent reflector other than the first plurality of wavelength-independent reflectors..

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance.

11. **Claim 2** is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Response to Arguments

12. Applicant's arguments filed 5/21/2007 have been fully considered but they are not persuasive.

On pages 8-9, the applicant argues, Shimomura's circulator 60, is neither equivalent to the optical path converter of claim 1 nor teaches the optical path converter of claim 1; because the applicant interprets the teaching of Shimomura, with respect to only figure 15, as the circulator 60 is configure to receives signal from the light source 31-34. Wherein, the signal passes through the Mux/Demux 410 first then to circulator 60. The examiner believes that the applicant had misinterpreted the basis for rejection of claim 1 above. With respect to figures 14 and 15, Shimomura teaches an optical circulator 60, which receives an optical signal from

transmission line 110 and transmits the optical signal to Mux/Demux 410 through transmission 120. It is obvious that optical signal received on transmission line 110 had be generated by some light source before it reaches circulator 60. The circulator's task is purely switching the received signal from 1 port to the next port in the circle. Thus, when an optical signal is received at transmission line 110, the optical signal is output from the next port, which is on transmission line 120. Claim 1 recites "an optical path converter being configured to output the pumping lights generated and received from the pumping-light generation section to the multiplexing port of the wavelength-division multiplexer/demultiplexer"; it appears that the circulator 60 of Shimomura is doing just that. Since, an optical signal (which originated from a light source) received on transmission line 110 by the circulator 60 is output on transmission line 120 to the Mux/Demux 410. Further, it would be apparent from the combined teaches of Hidenori and Shimomura shows, that the light source 14, of Hidenori, is transmitted to circulator 60, of Shimomura, then to Mux/Demux 410, of Shimomura; since, both devices are located in front of the Mux/Demux, looking from left to right.

13. In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

Conclusion

14. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

15. Any response to this Office Action should be **faxed to** (571) 273-8300 **or mailed to**:

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Hand-delivered responses should be brought to

Customer Service Window
Randolph Building
401 Dulany Street
Alexandria, VA 22314

16. Any inquiry concerning this communication or earlier communications from the Examiner should be directed to Thi Le whose telephone number is (571) 270-1104. The Examiner can normally be reached on Monday-Friday from 7:30am to 5:00pm.

If attempts to reach the Examiner by telephone are unsuccessful, the Examiner's supervisor, Rafael Perez-Gutierrez can be reached on (571) 272-7915. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free) or 703-305-3028.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist/customer service whose telephone number is (571) 272-2600.

Thi Le

KENNETH VANDERPUYE
SUPERVISORY PATENT EXAMINER